Maternal Deaths in the United States
Understanding the Data and Moving Forward

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Division of Reproductive Health

Centers for Disease Control and Prevention

Governor's Taskforce on Maternal Mortality and Disparate Racial Outcomes

New York State Department of Health

June 27, 2018

Presenter Disclosures

- No financial disclosures

- The findings and conclusions in this report are those of the author and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

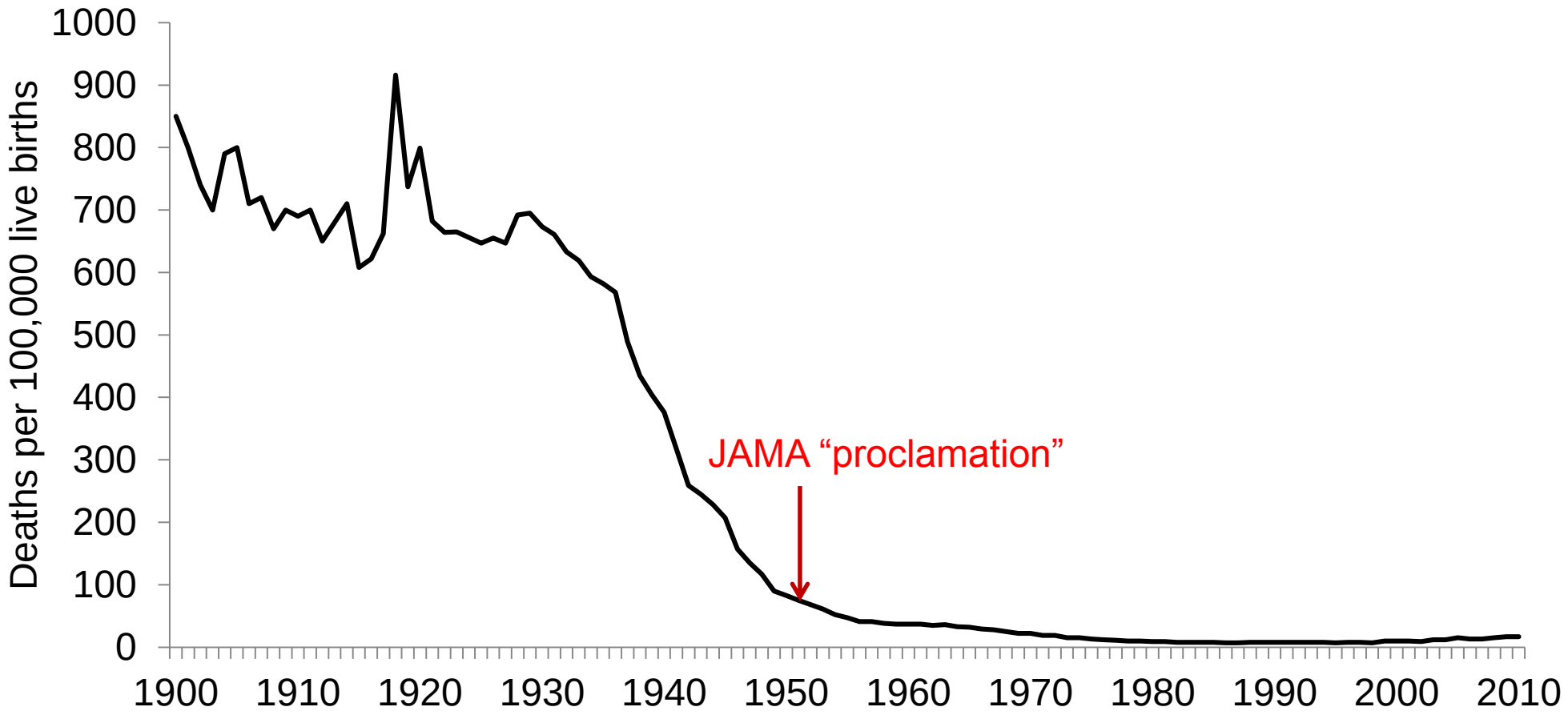
J. A. M. A.
Nov. 25, 1950

MATERNAL DEATHS—ONE IN A THOUSAND

THE JOURNAL takes pride in announcing that for the first time in history the maternal mortality rate for a large nation—the United States of America—has been pushed slightly below the apparently irreducible minimum of 1 maternal death per 1,000 live births. When

This is, indeed, a story of human as well as medical progress. The fact that the chances of survival for the mother are better than 999 out of 1,000 should bring comfort and consolation in a troubled era to expectant mothers and their husbands, their children and their parents. Childbearing has been made quite safe.

Maternal Mortality Rate, United States

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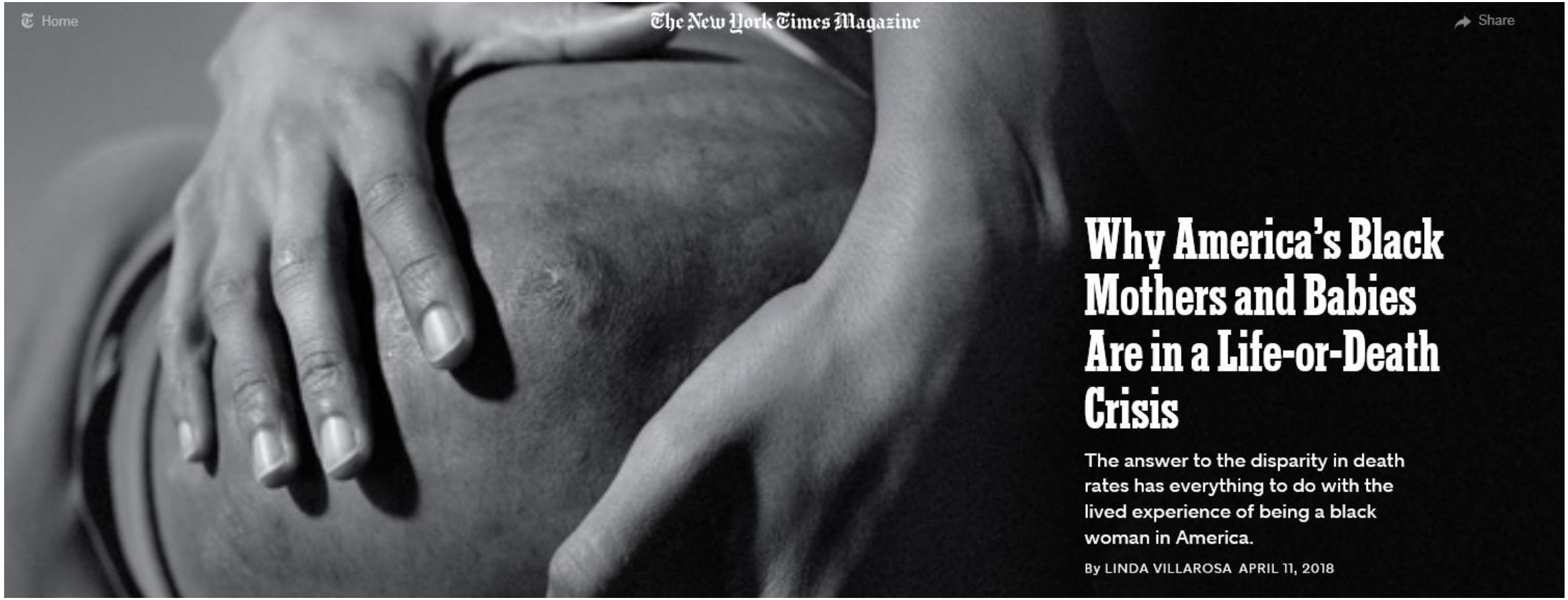
LOST MOTHERS
How Many American Women Die From Causes Related to Pregnancy or Childbirth? No One Knows.
Data collection on maternal deaths is so flawed and under-funded that the federal government no longer even publishes an official death rate.
by Robin Fields and Joe Sexton, Oct. 23, 8 a.m. EDT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The New York Times Magazine
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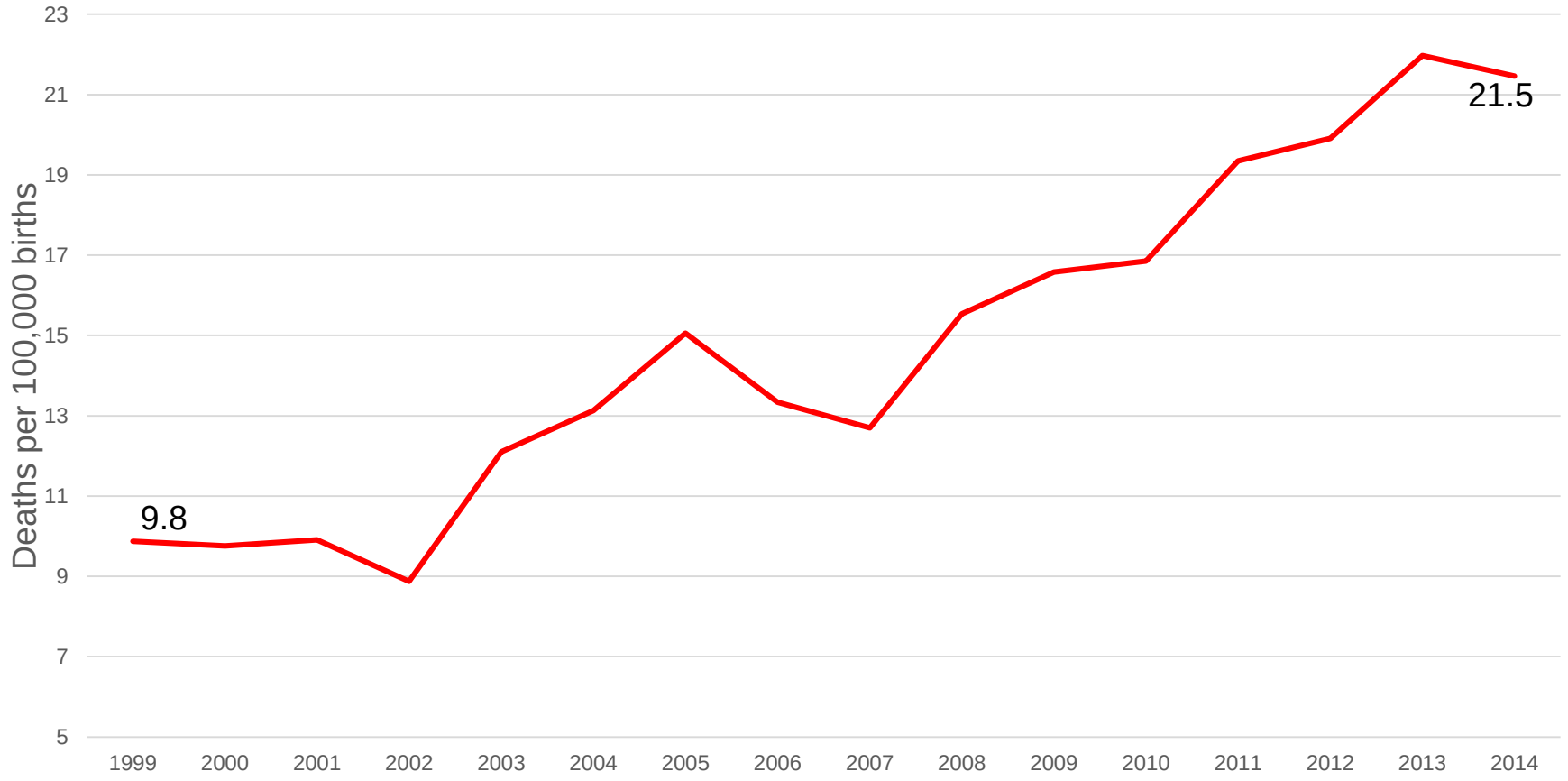
Why America's Black Mothers and Babies Are in a Life-or-Death Crisis
The answer to the disparity in death rates has everything to do with the lived experience of being a black woman in America.
By LINDA VILLAROSA APRIL 11, 2018

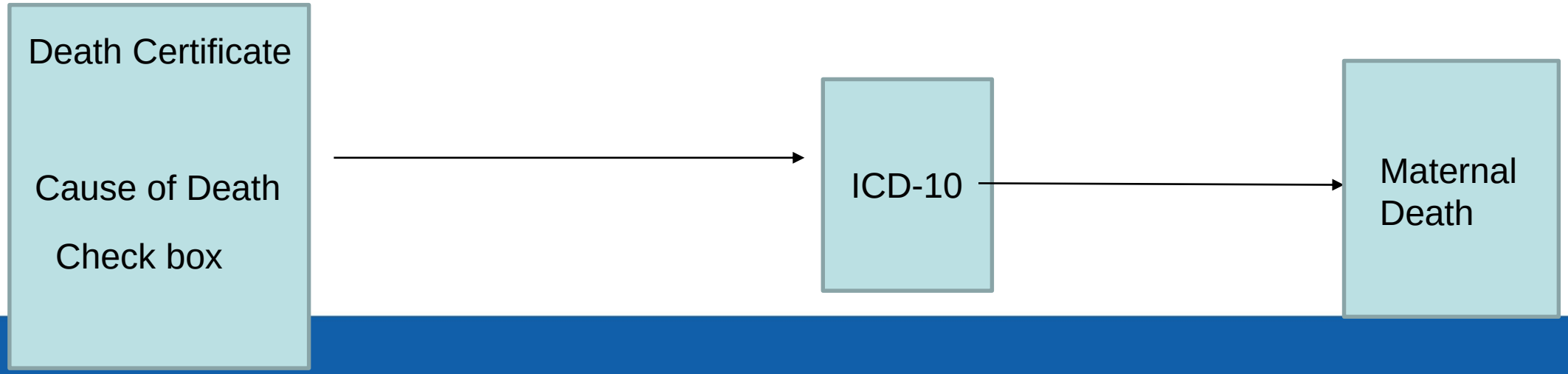
Maternal Mortality Rate, 1999-2014



National Vital Statistics System (NVSS); CDC WONDER

Maternal Mortality: Vital Statistics

Maternal death is the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.



MMWR

Weekly

October 03, 1986 / 35(39);621-3

Misclassification of Maternal Deaths -- Washington State

MMWR

Weekly

July 19, 1991 / 40(28);469-471

Perspectives in Disease Prevention and Health Promotion Enhanced Maternal Mortality Surveillance -- North Carolina, 1988 and 1989

CDC

CENTERS FOR DISEASE CONTROL AND PREVENTION

February 10, 1995 / Vol. 44 / No. 5

MMWR

MORBIDITY AND MORTALITY WEEKLY REPORT

Pregnancy-Related Mortality — Georgia, 1990–1992

Original Research

Underreporting of Pregnancy-Related Mortality in the United States and Europe

Catherine Deneux-Tharaux, MD, MPH, Cynthia Berg, MD, MPH, Marie-Helene Bouvier-Colle, PhD, Mika Gissler, PhD, Margaret Harper, MD, PhD, Angela Nannini, FNP, PhD, Sophie Alexander, MD, PhD, Katherine Wildman, PhD, Gerard Breart, MD, and Pierre Buekens, MD, PhD

Obstet Gynecol 2005;106:684-92

The Check Box

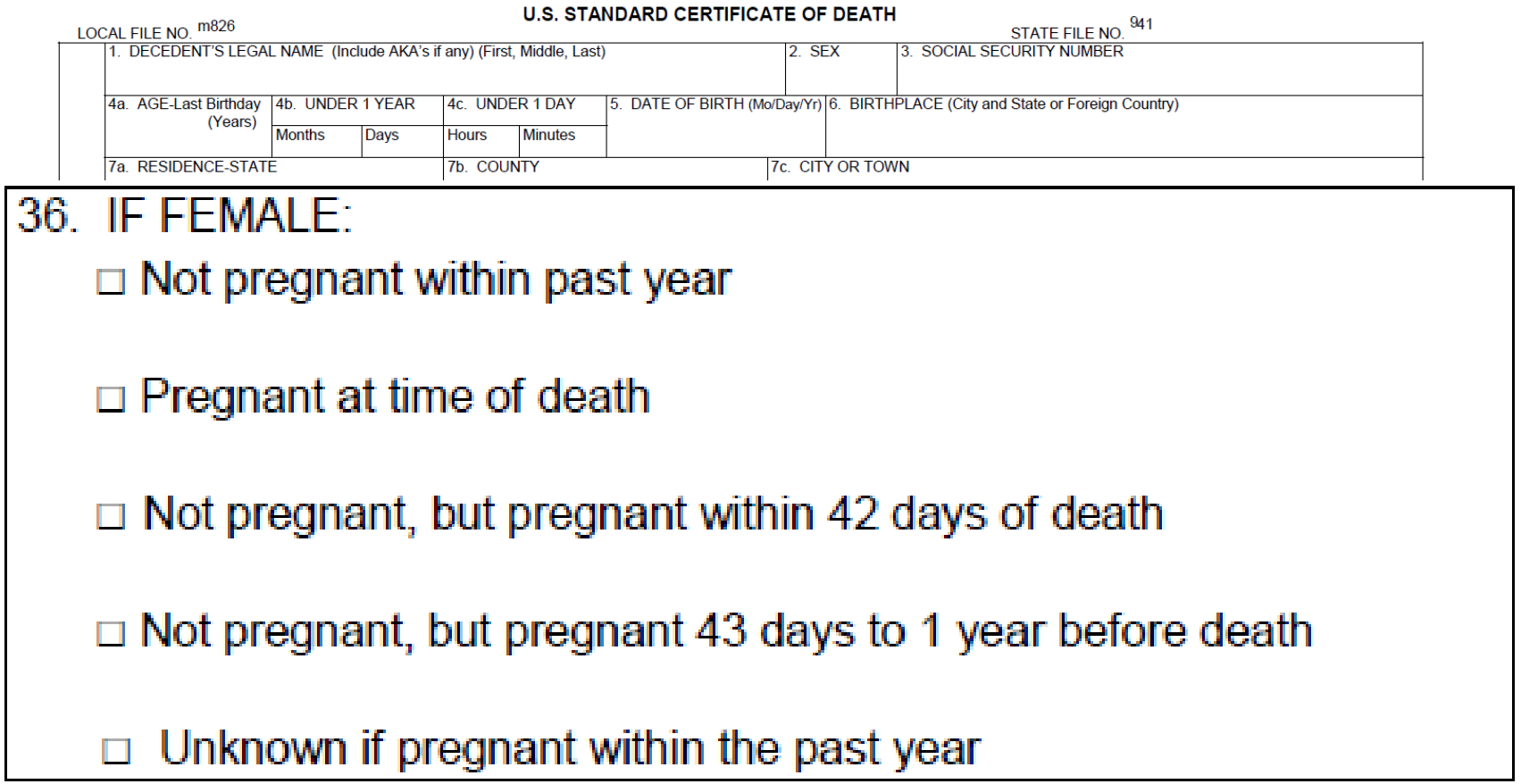
Determining Pregnancy Status to Improve Maternal Mortality Surveillance

Andrea P. MacKay, MSPH, Roger Rochat, MD, Jack C. Smith, MS, Cynthia J. Berg, MD, MPH

Am J Prev Med 2000;19:35-39

Vital statistics, 1991-1992
Checkbox is a simple and effective way of identifying maternal deaths
Regular use by all states would enhance surveillance

2003 and beyond: Pregnancy checkbox



U.S. STANDARD CERTIFICATE OF DEATH

LOCAL FILE NO. m826 STATE FILE NO. 941

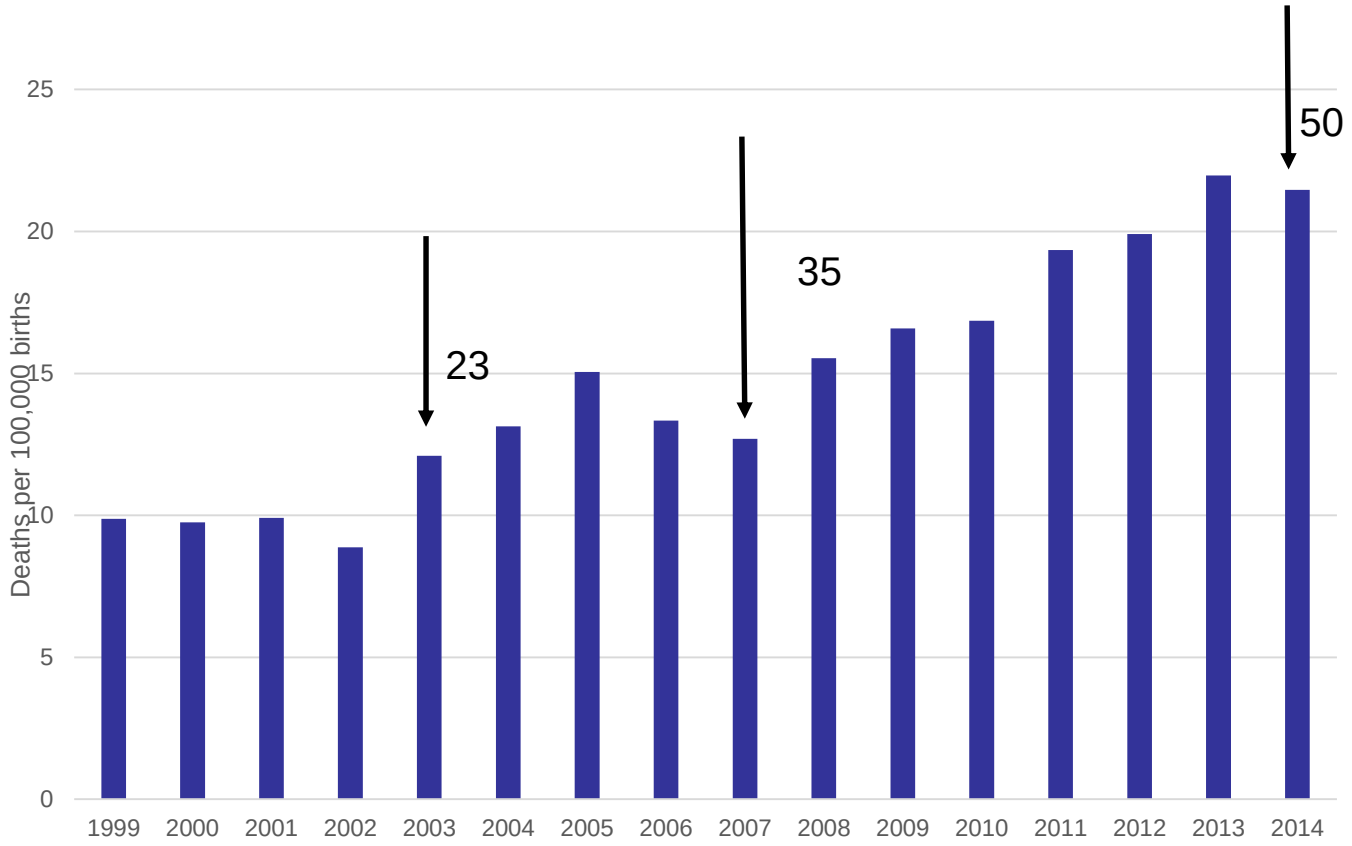
1. DECEDENT'S LEGAL NAME (Include AKA's if any) (First, Middle, Last)				2. SEX	3. SOCIAL SECURITY NUMBER
4a. AGE-Last Birthday (Years)	4b. UNDER 1 YEAR Months	Days	4c. UNDER 1 DAY Hours	Minutes	5. DATE OF BIRTH (Mo/Day/Yr)	6. BIRTHPLACE (City and State or Foreign Country)
7a. RESIDENCE-STATE	7b. COUNTY		7c. CITY OR TOWN		

36. IF FEMALE:

- ☐ Not pregnant within past year
- ☐ Pregnant at time of death
- ☐ Not pregnant, but pregnant within 42 days of death
- ☐ Not pregnant, but pregnant 43 days to 1 year before death
- ☐ Unknown if pregnant within the past year

2003: 21 states with checkbox; 2 states with prompt
2005: 35 states with checkbox or prompt
2015:46 states and DC with standard checkbox; 3 states non-standard checkbox

Maternal Mortality Rate, 1999-2014



National Vital Statistics System; CDC WONDER

Original Research

Identifying Maternal Deaths in Texas Using an Enhanced Method, 2012

Sonia Baeva, MA, Debra L. Saxton, MS, Karen Ruggiero, PhD, Michelle L. Kormondy, BS, Lisa M. Hollier, MD, MPH, John Hellerstedt, MD, Manda Hall, MD, and Natalie P. Archer, PhD

Obstet Gynecol 2018;131:762-9

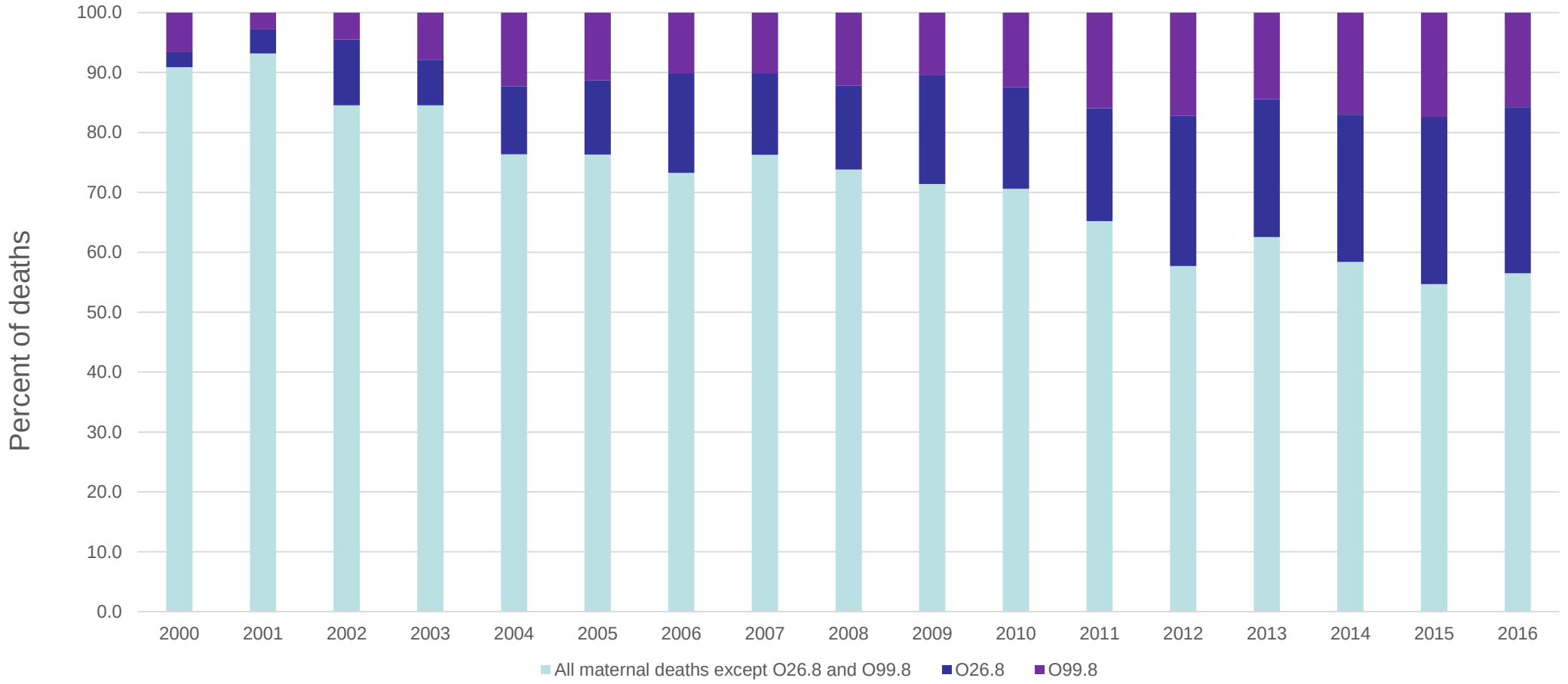
Half of deaths coded as maternal showed no evidence of pregnancy upon review.

Editorial

Making Vital Statistics Count: Preventing U.S. Maternal Deaths Requires Better Data

MacDorman et al. Obstet Gynecol 2018;131:759-61

Distribution of ICD-10 O chapter codes recorded as underlying cause-of-death, 2000-2016



O 26.8:Other specified pregnancy related conditions
O 99.8:Other specified diseases and conditions complicating pregnancy, childbirth and the puerperium

Pregnancy Mortality Surveillance System (PMSS)

- **ACOG/CDC Maternal Mortality Study Group (1986)**
- **Pregnancy-associated (temporal relationship)**
  - All deaths during pregnancy and within the year following the end of pregnancy
- **Pregnancy-related (subset of pregnancy-associated; causal relationship)**
  - Complication of pregnancy
  - Aggravation of a unrelated condition by the physiology of pregnancy
  - Chain of events initiated by the pregnancy
- **Pregnancy-related mortality ratio (PRMR; deaths per 100,000 births)**

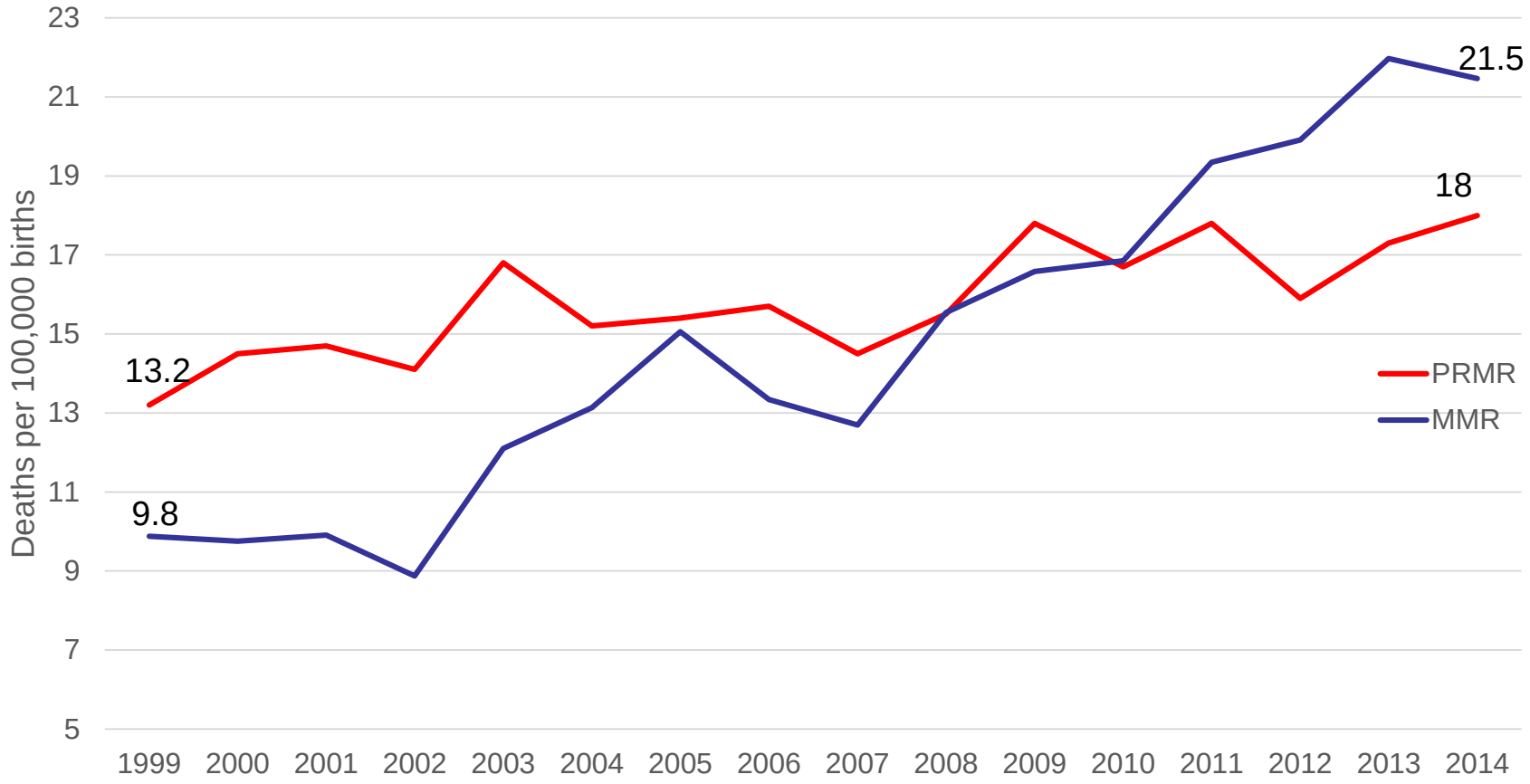
ACOG: American College of Obstetricians and Gynecologists

PMSS: Enhanced Surveillance

- **Based on death and linked birth or fetal death certificates when death occurred following birth or stillbirth**
- **Independent of ICD-10**
- **Information includes COD and checkbox indicating recent or current pregnancy status and all other details concerning pregnancy**
  - COD descriptions often unclear
  - If checkbox only and unclear COD, difficult to include or exclude
- **Clinical relevance instead of rule-based designation of COD**

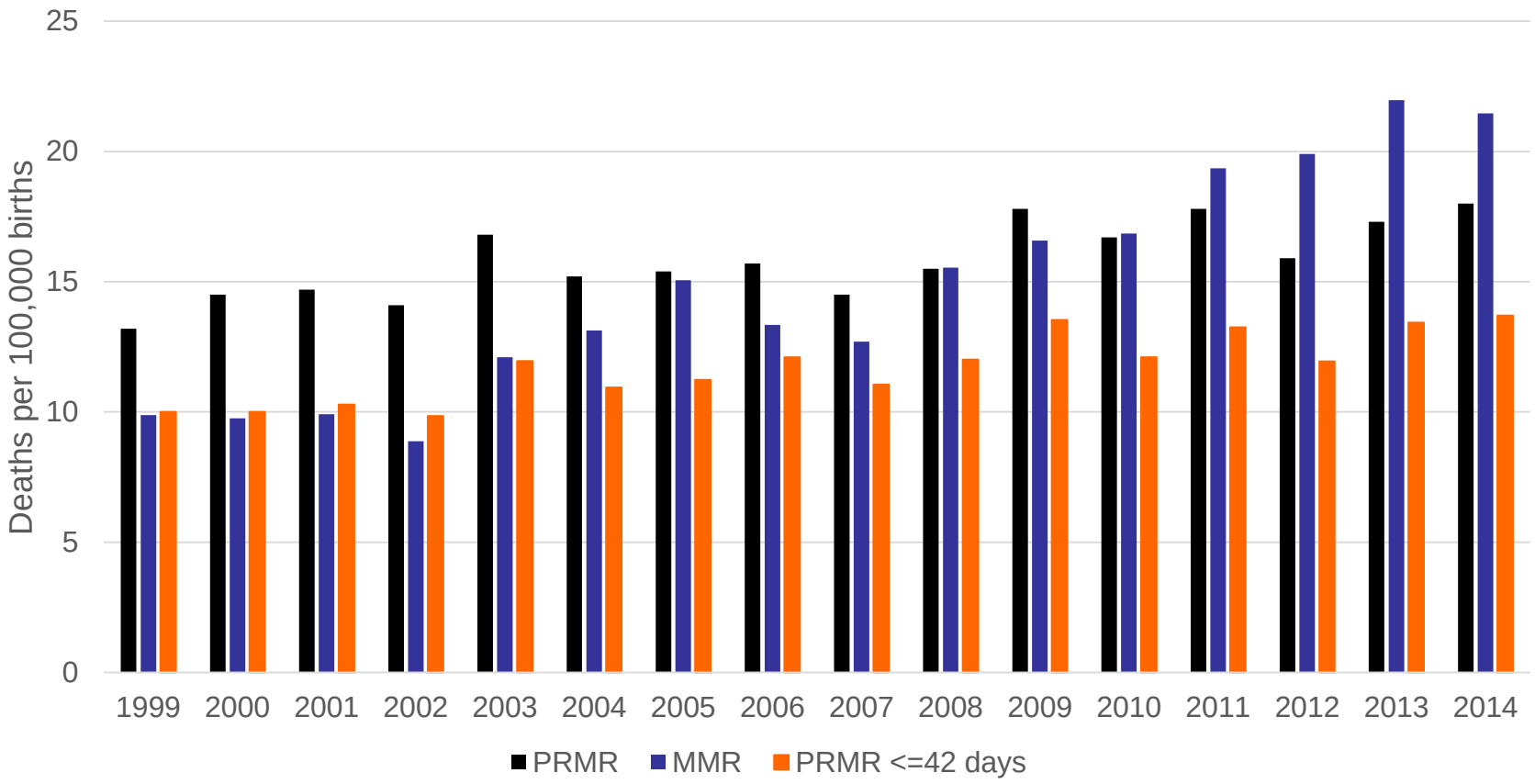
COD: cause of death

Comparison: MMR and PRMR



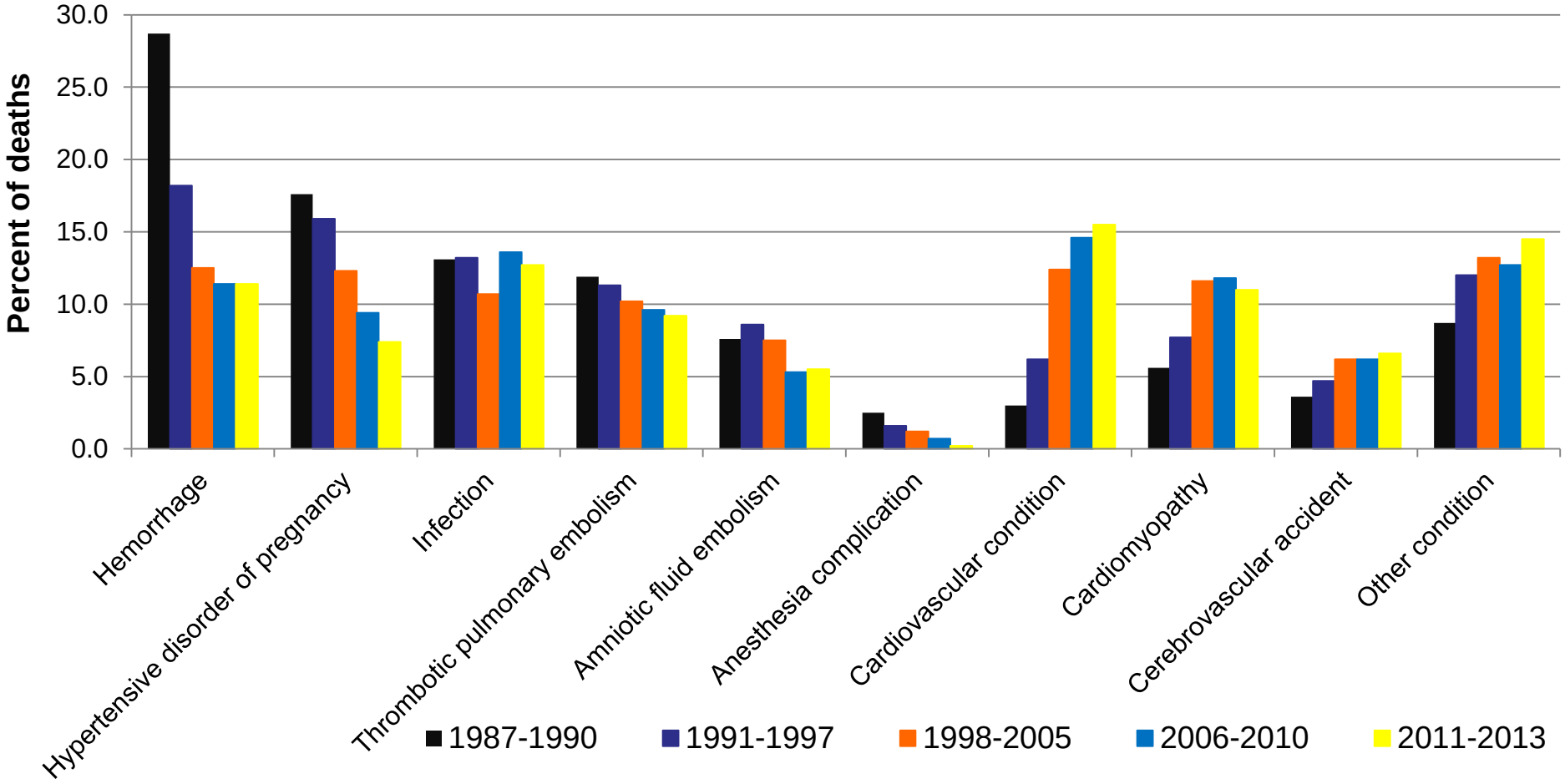
Pregnancy Mortality Surveillance System https://www.cdc.gov/reproductivehealth/maternalinfanthealth/pmss.html
PRMR: Pregnancy-related mortality ratio
MMR: Maternal Mortality rate

Comparison: MMR and PRMR



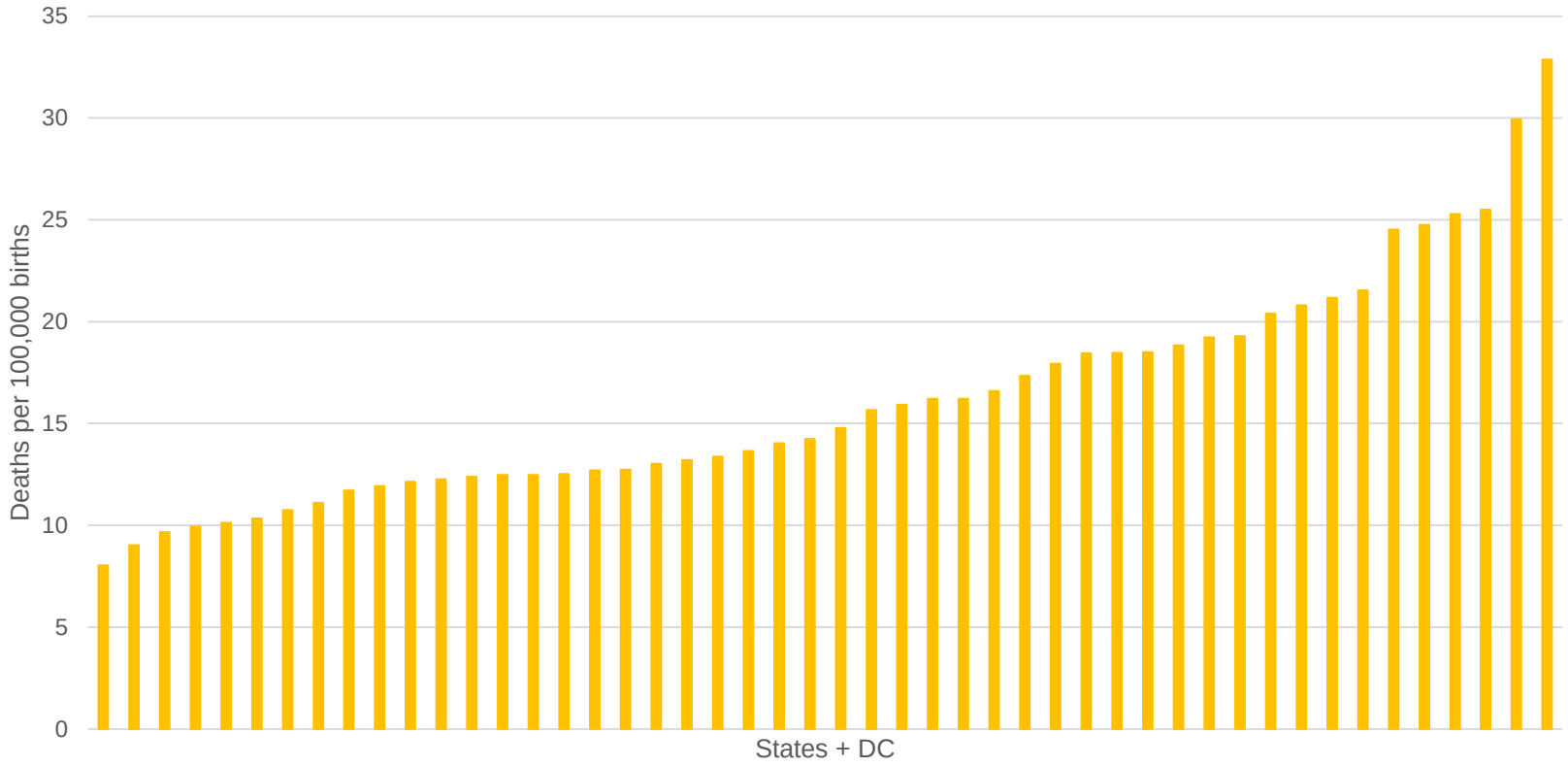
PRMR: Pregnancy-related mortality ratio MMR: maternal mortality rate

Cause-specific proportionate pregnancy-related mortality, PMSS, 1987-2013

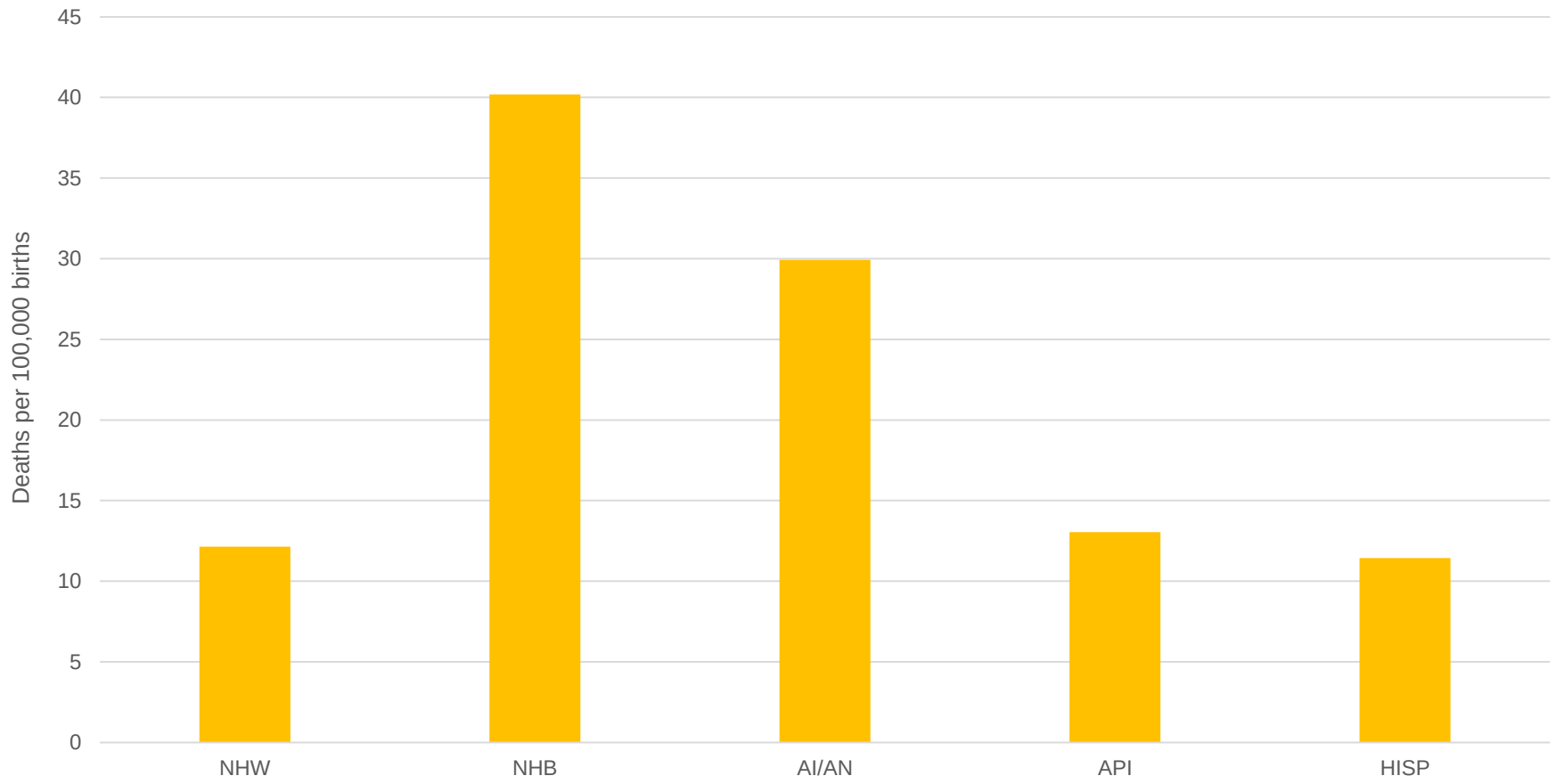


Creanga AA, et al. Obstet Gynecol 2015;125:5-12.

Pregnancy-related Mortality Ratios by State, PMSS, 2006-2013

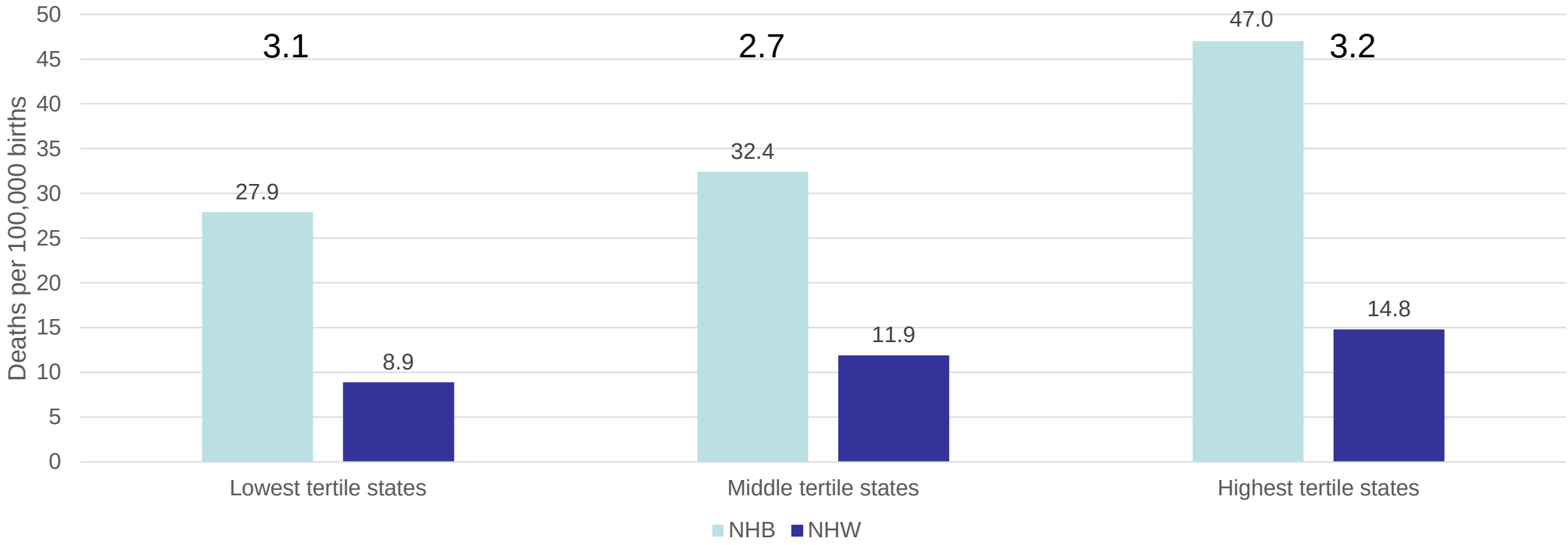


Pregnancy-related Mortality by Race and Hispanic Ethnicity, 2006-2013



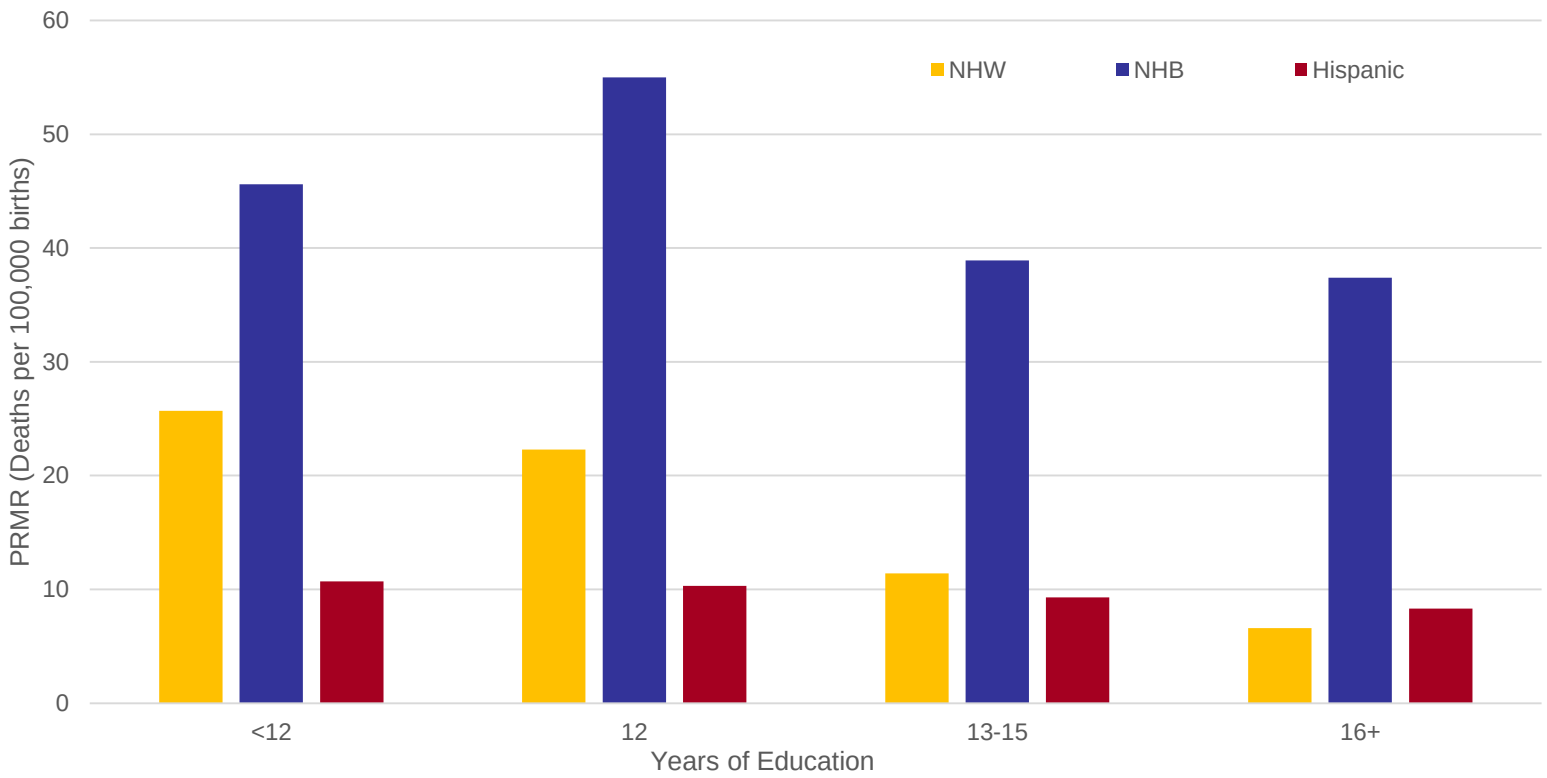
NHW: Non-Hispanic white NHB: Non-Hispanic black AI/AN: American Indian/Alaska Native
API: Asian/Pacific Islander

Black: White Pregnancy-related Mortality Ratios, PMSS, 2006-2013



Pregnancy Mortality Surveillance System

PRMR by Race/Ethnicity and Education



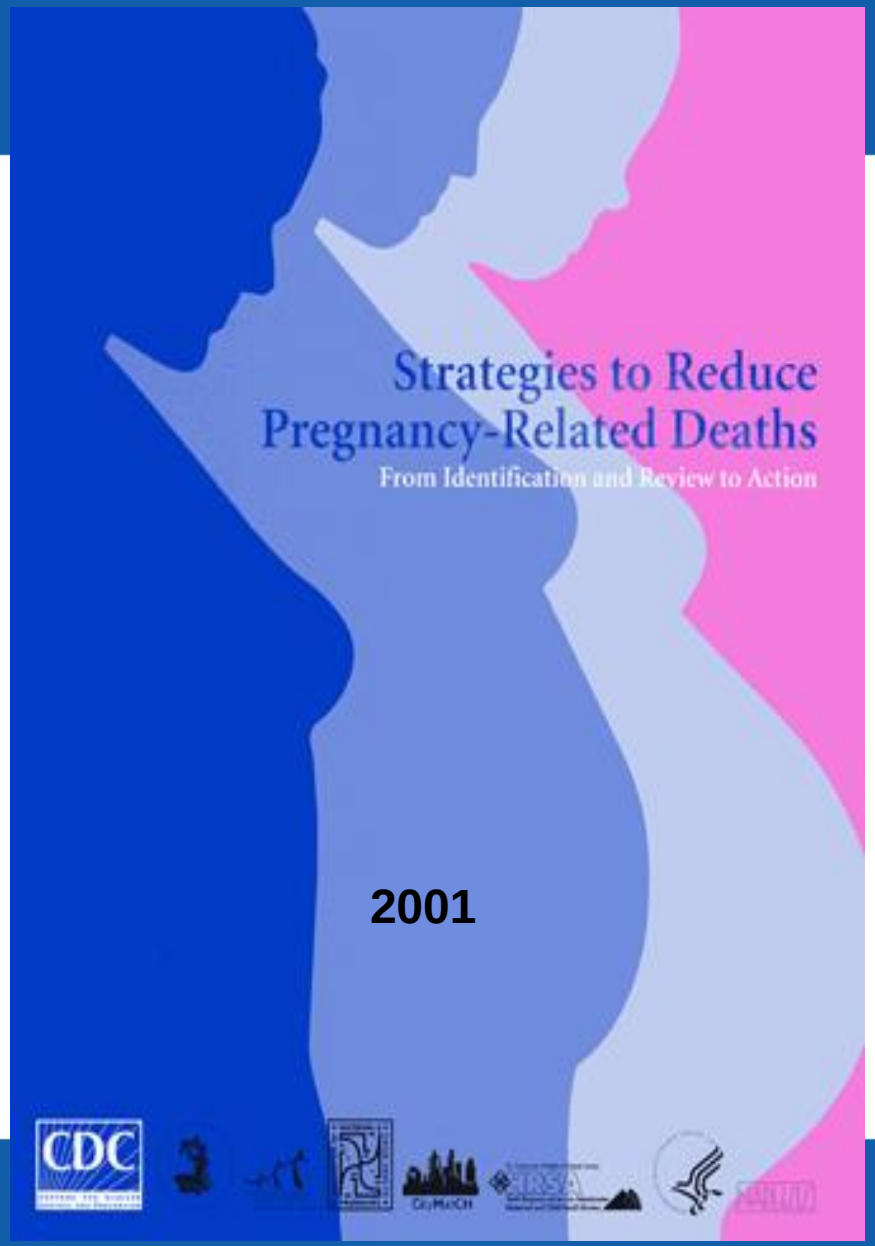
What Are the Real Trends in Maternal Mortality?

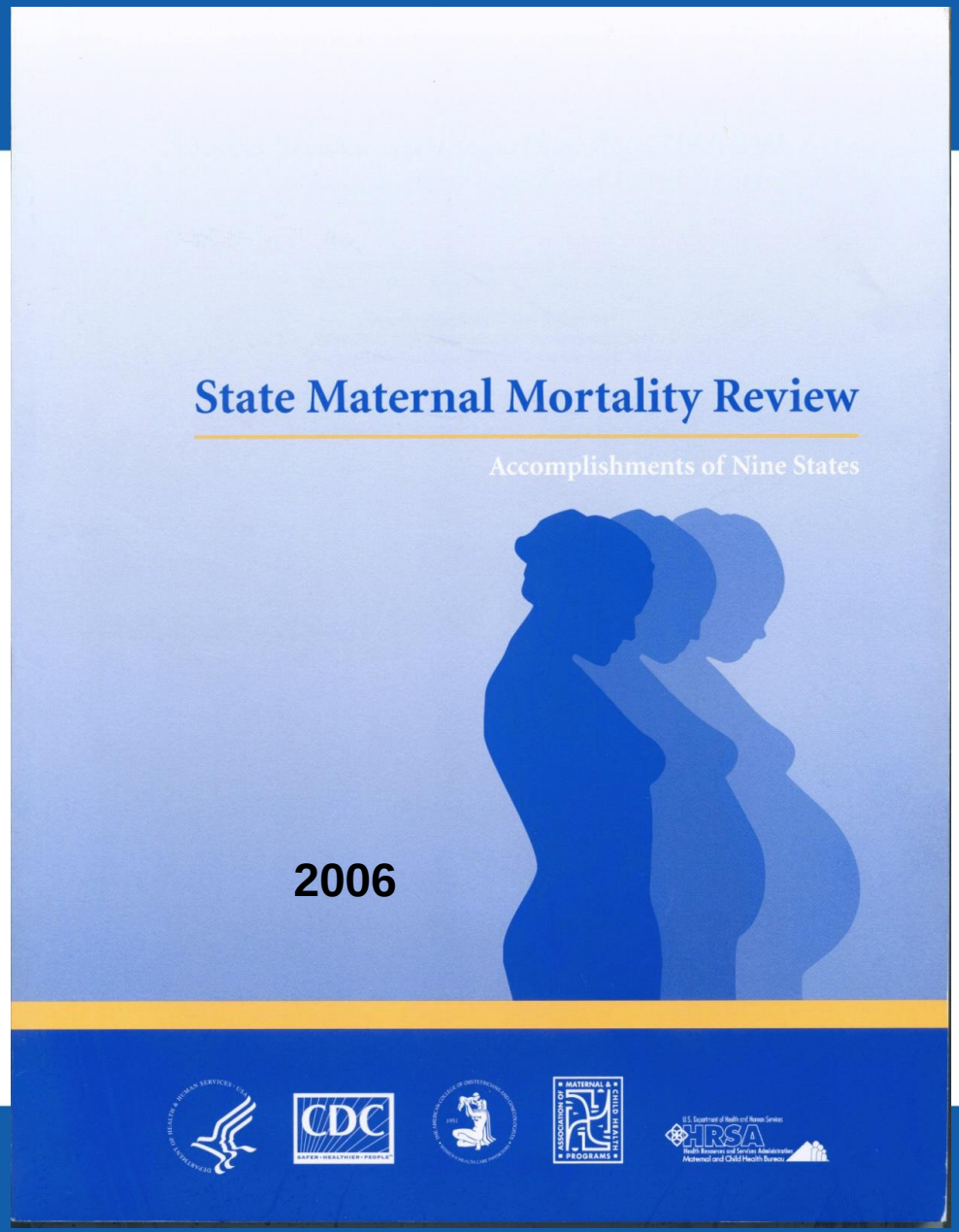
- **The *measured* maternal mortality rate is increasing**
- **The pregnancy-related mortality rate has increased but is now relatively stable**
- **Disparities are persistent, and some causes of death may be increasing**
- **There are hints that efforts to improve identification have resulted in misclassification**
  - What is the extent of the false positives?
  - What is the extent of the false negatives?
  - Why are mistakes being made?

Beyond Better Data

- **We need to aspire to something greater**
  - Information needed for prevention will not be found on death certificates

- **There is no acceptable rate of maternal mortality**


Strategies to Reduce
Pregnancy-Related Deaths
From Identification and Review to Action
2001
CDC


State Maternal Mortality Review
Accomplishments of Nine States
2006
CDC
HRSA

Invitational Meeting on State Maternal Mortality Review September 2003

In September 2003, the Safe Motherhood Partnership* and the American College of Obstetricians and Gynecologists sponsored a 2-day meeting for nine states with active maternal mortality review committees. We would like to thank the people who participated in this meeting for their contributions to this publication and for their ongoing efforts to improve women's health before, during, and after pregnancy.

State Representatives

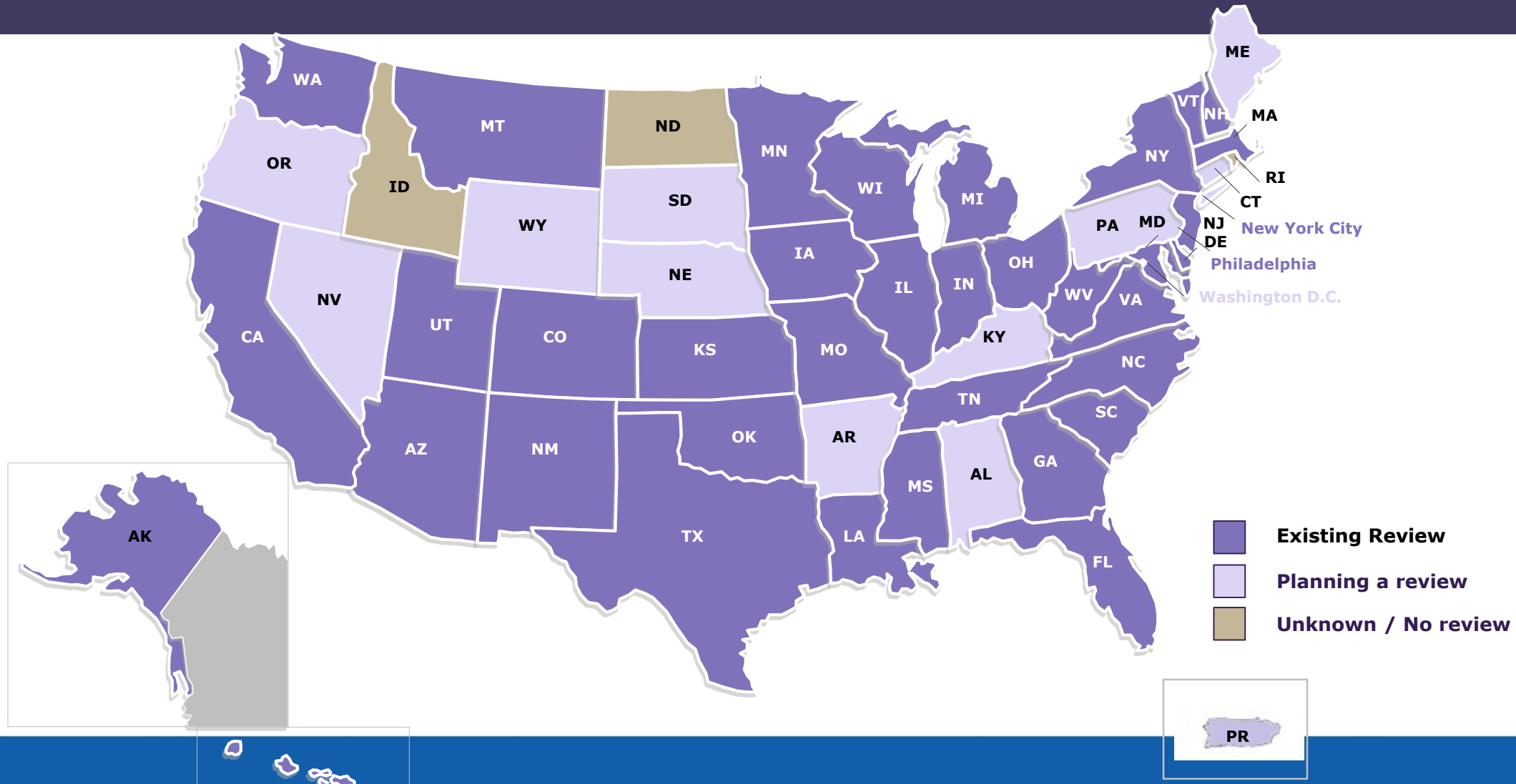
Florida
Carol Graham, PhD
Annette Phelps, ARNP
Massachusetts
Linda Clayton, MD, MPH
Angela Nannini, FNP, PhD
Michigan
James Gell, MD
Joanne Hogan, PhD
New Jersey
Elizabeth Ferraro, RN, MSN, APNC
James Thompson, MD
New Mexico
Margaret Wolak, MD
Anne Worthington, MPH
New York
Mary Applegate, MD
Jeffrey King, MD, FACOG
North Carolina
Margaret Harper, MD, MS
Utah
Lois Bloebaum, BSN
Michael Varner, MD
Virginia
Cheryl Bodamer, RN, MPH

http://www.amchp.org/Calendar/Webinars/Womens-Health-Info-Series/Documents/StrII.pdf

Building U.S. Capacity to Review and Prevent Maternal Deaths

- Technical assistance to support jurisdiction-level maternal mortality review
- Promotes opportunities to identify interventions with the greatest potential to end preventable maternal mortality
- Partnership of CDC Division of Reproductive Health, the Association of Maternal and Child Health Programs, and the CDC Foundation (funded through an award agreement with Merck on behalf of its Merck for Mothers program)

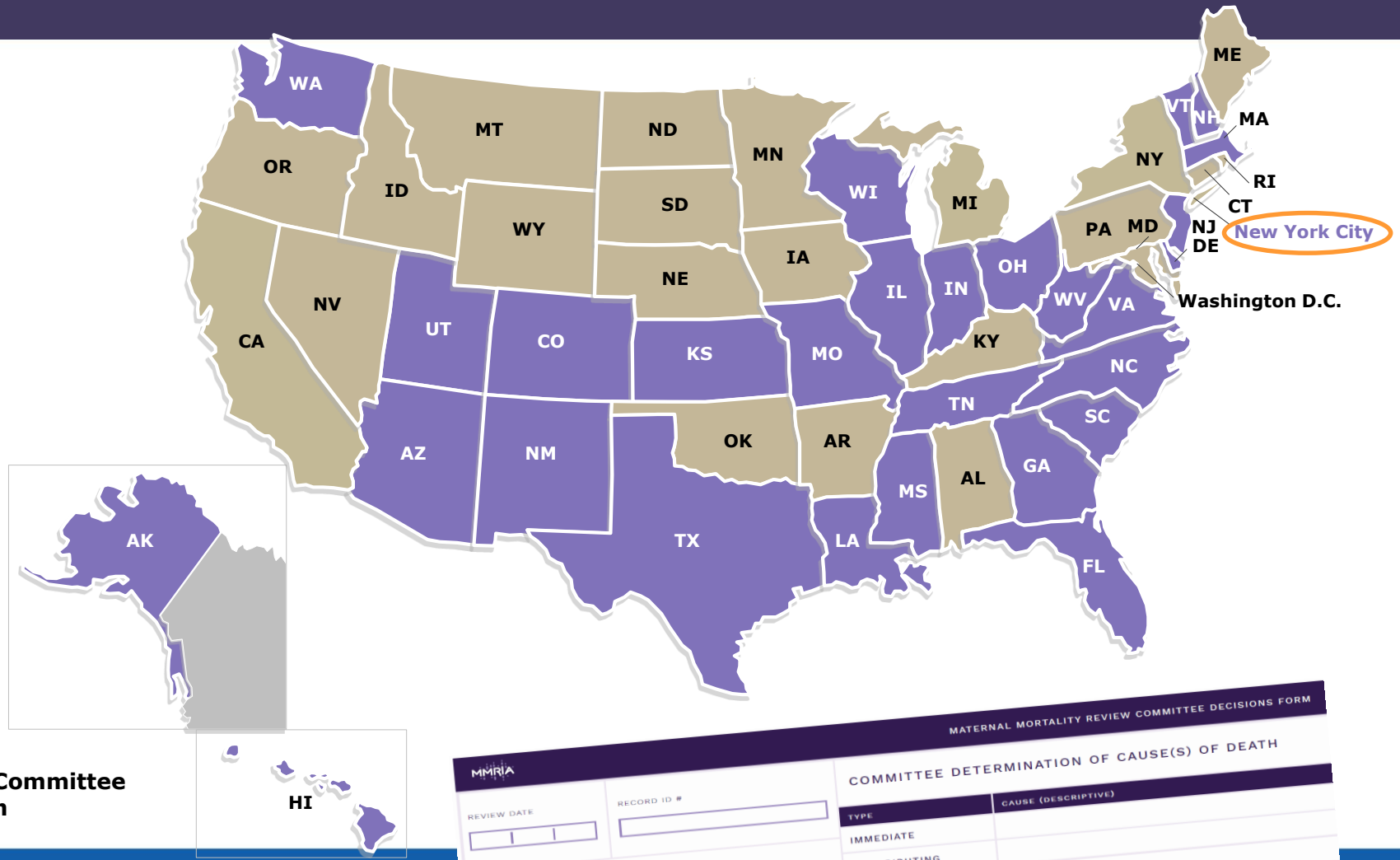
MMRCs: Where we are today



Resources: Maternal Mortality Review Information Application (MMRIA)

- Addresses barrier identified by MMRCs (2012)
- Built with expert input
- Lessons learned from precursor (2014-2016)
- One stop shop
- Comprehensive, but standardized
- Common language for reviews to work together
- 22 jurisdictions using MMRIA, 7 preparing to use (but are using the committee decisions form), 5 on the wait list

A Common Language



Using MMRIA Committee Decisions Form

MMRIA

MATERNAL MORTALITY REVIEW COMMITTEE DECISIONS FORM

REVIEW DATE

RECORD ID #

PREGNANCY-RELATEDNESS: SELECT ONE

☐ **PREGNANCY-RELATED**
The death of a woman during pregnancy or within one year of the end of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy, or the aggravation of an unrelated condition by the physiologic effects of pregnancy

☐ **PREGNANCY-ASSOCIATED, BUT NOT -RELATED**
The death of a woman during pregnancy or within one year of the end of pregnancy from a cause that is not related to pregnancy.

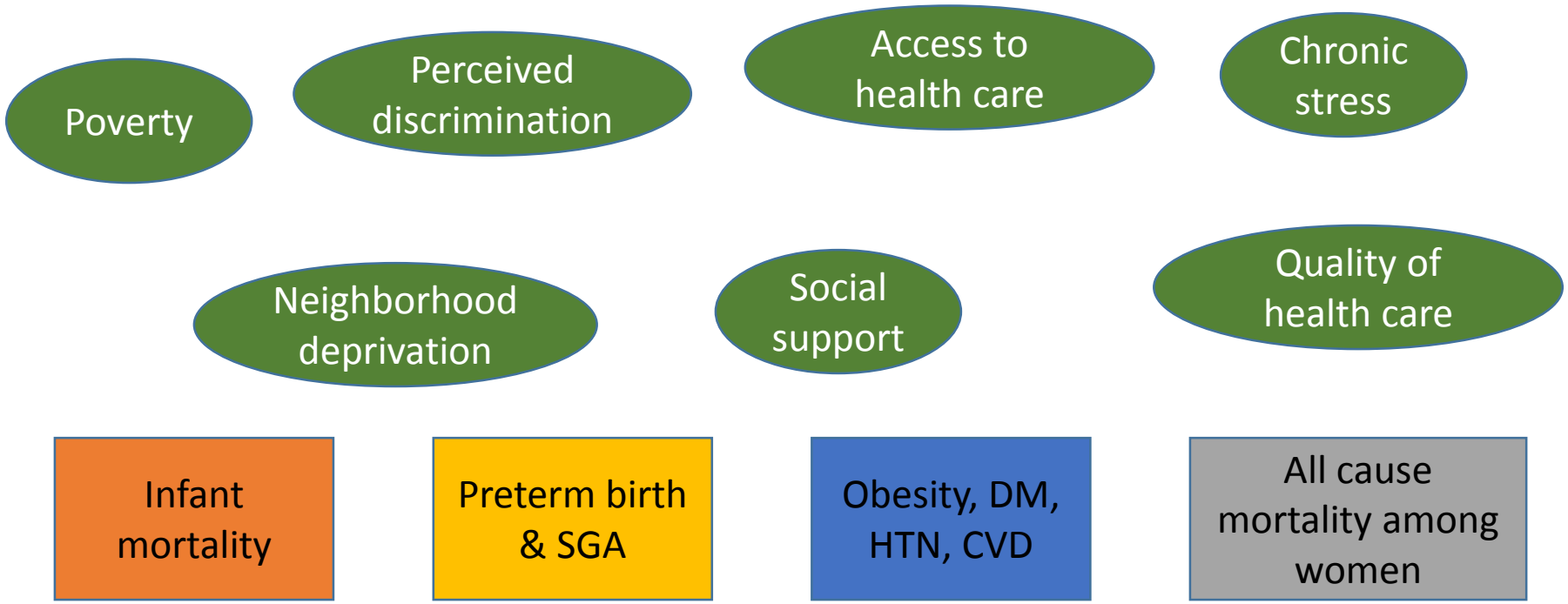
COMMITTEE DETERMINATION OF CAUSE(S) OF DEATH

TYPE	CAUSE (DESCRIPTIVE)
IMMEDIATE	
CONTRIBUTING	
UNDERLYING	
OTHER SIGNIFICANT	

IF PREGNANCY-RELATED, COMMITTEE DETERMINATION OF UNDERLYING CAUSE OF DEATH
Refer to attached page for PMSS-MM cause of death list. If more than one is selected, list in orde
importance beginning with the most compelling (1-2; no more than 2 may be selected in the sys

Challenge: Inequity

Social determinants of women's morbidity & mortality?



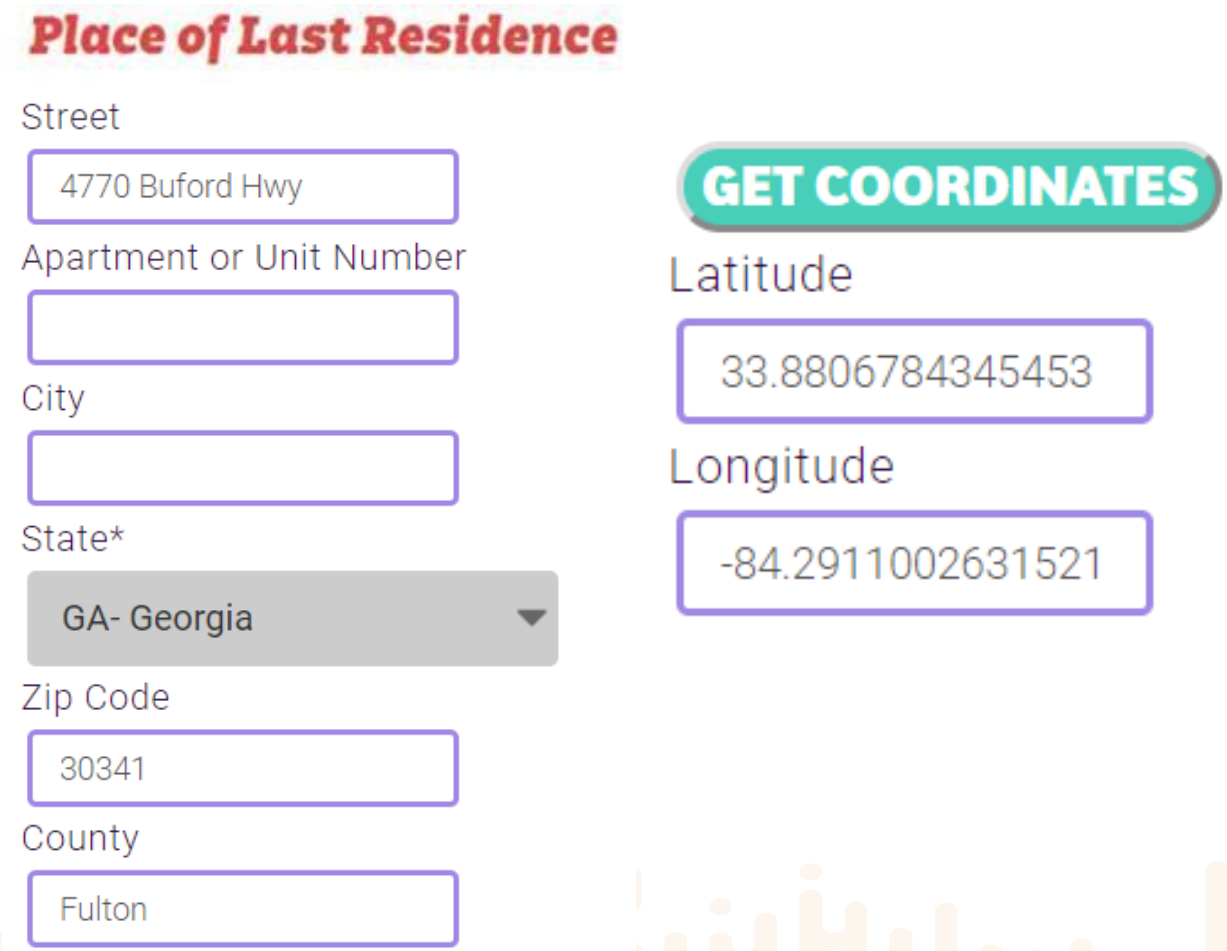
From Michael Kramer (Emory)

A Unique Role

Maternal Mortality Review Committees have access to multiple sources of information that provide a deeper *understanding of the circumstances* surrounding a woman's death. With these insights review committees *develop actionable recommendations to prevent future deaths*.

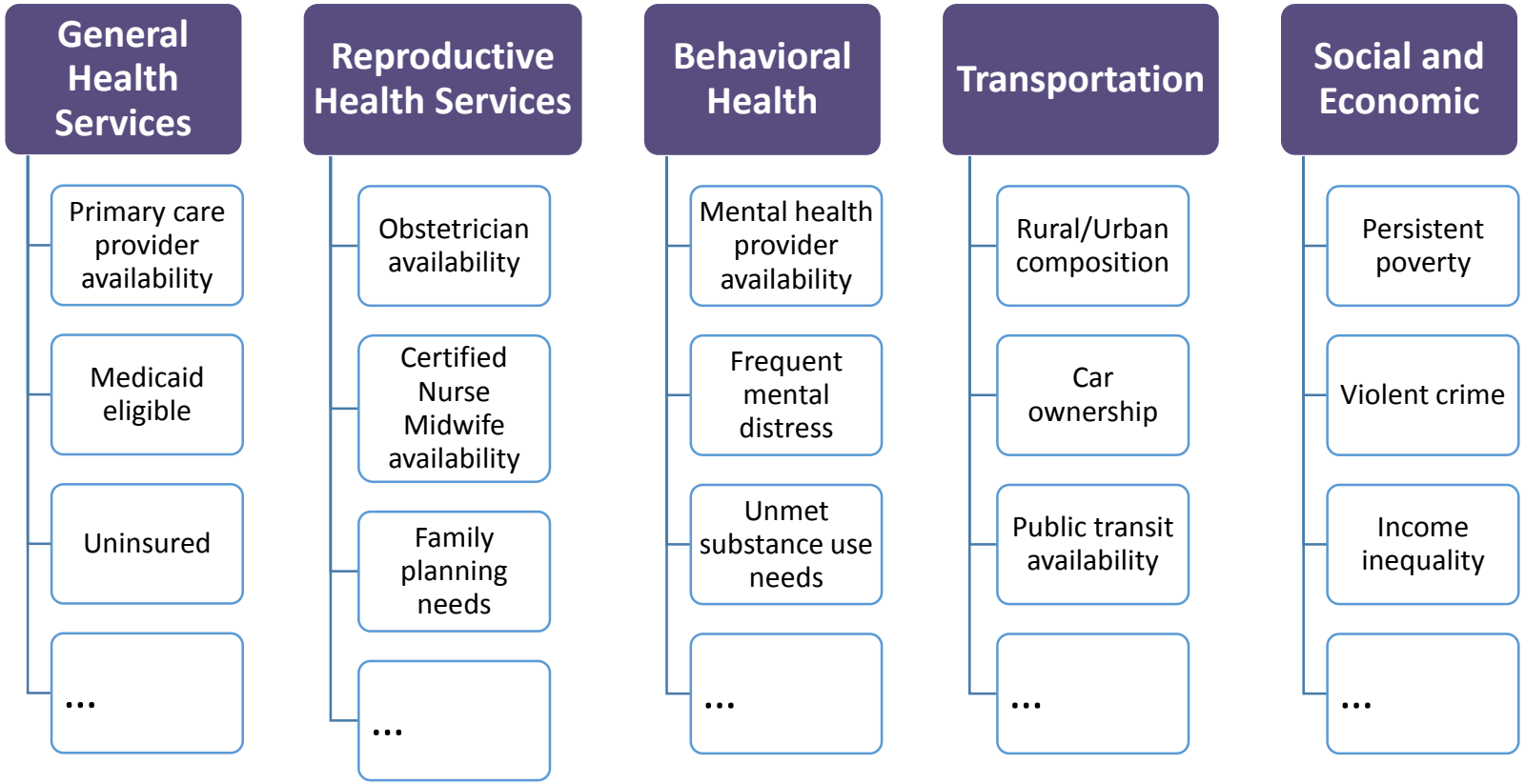
Geocoding: How it works in MMRIA

Place-based data: abstractor view

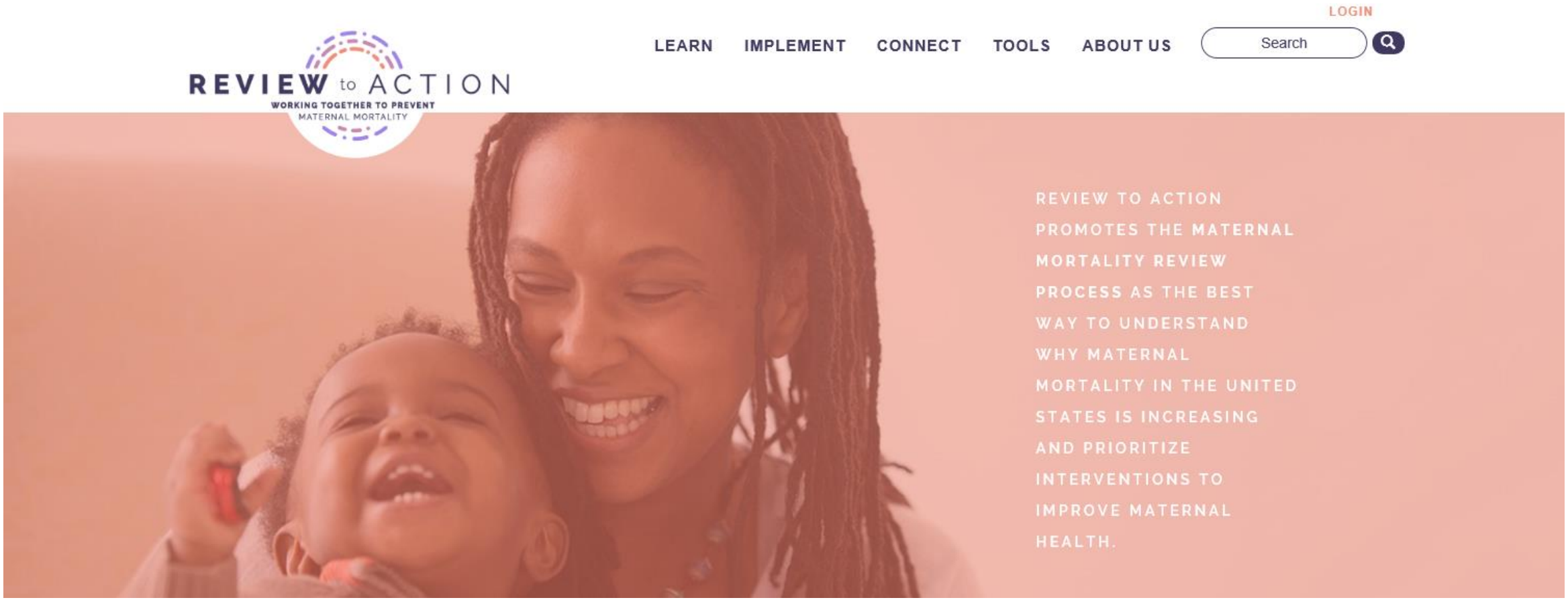


Socio-Spatial Framework: Domains and Indicators

5 domains with examples of indicators



Adapted from: Report from Nine Maternal Mortality Review Committees. http://www.reviewtoaction.org/rsc-ra/term/70



http://reviewtoaction.org/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AIM Program
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Home // Alliance for Innovation on Maternal Health Program
AIM Logo_Latest
ALLIANCE FOR INNOVATION
ON MATERNAL HEALTH AIM

- **NYS received an award from CDC to support their Perinatal Quality Collaborative**

Centers for Disease Control and Prevention
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SEARCH

CDC A-Z INDEX

Reproductive Health

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- About Us +
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- Emergency Preparedness and Response +
- Maternal and Child Health Epidemiology Program +
- Pregnancy Risk Assessment Monitoring System
- Infertility +
- Assisted Reproductive Technology (ART)
- Depression Among Women +
- Maternal and Infant Health −
  - Pregnancy Complications +
  - Diabetes During Pregnancy +

CDC > Reproductive Health > Maternal and Infant Health > Perinatal Quality Collaboratives

National Network of Perinatal Quality Collaboratives

CDC and the March of Dimes launched the National Network of Perinatal Quality Collaboratives (NNPQC) to support state-based perinatal quality collaboratives in making measureable improvements in statewide health care and health outcomes for mothers and babies. In 2017, CDC awarded the National Institute for Children's Health Quality (NICHQ) to serve as the coordinating center for the NNPQC. NICHQ will coordinate NNPQC activities, including providing support, mentoring, and resources for perinatal quality collaboratives (PQCs) to:

- Strengthen PQC leadership
- Identify and disseminate best practices for establishing and sustaining PQCs, and
- Identify and develop tools, training, and resources necessary to foster the sharing of best practices to support a sustainable PQC infrastructure.

https://www.cdc.gov/reproductivehealth/maternalinfanthealth/nnpqc.htm

Thank You

wgc0@cdc.gov